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LONG ISLAND BASIN

HEMPSTEAD LAKE DAM

NASSAU COUNTY, NEW YORK INVENTORY NO. N.Y. 108

PHASE I INSPECTION REPORT NATIONAL DAM SAFETY PROGRAM

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NEW YORK DISTRICT CORPS OF ENGINEERS

JULY 1981

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SECUPITY CLASSIFICATION

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped for all storms exceeding approximately 2 percent of the PMF. The overtopping of the dam could cause the erosion of both abutments and the downstream face of the dam resulting in dam failure, thus significantly increasing the hazard to the loss of life downstream. The spillway is therefore adjudged as "seriously inadequate" and the dam is assessed as unsafe, non-emergency.

The classification of "unsafe" applied to a dam because of a "seriously inadequate" spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean that there appears to be a serious deficiency in spillway capacity and if a severe storm were to occur, overtopping and failure of the dam could take place, significantly increasing the hazard to loss of life downstream of the dam.

It is therefore recommended that within 3 months of notification to the owner, detailed hydrologic/hydraulic investigations of the structure should be undertaken to more accurately determine the site specific characteristics of the watershed and their affect upon the overtopping potential of the dam. The results of these investigations will determine the appropriate remedial measures which will be required to achieve a spillway capacity adequate to discharge the outflow from at least the one-half PMF. Within 12 months of the date of notification to the owner, modifications to the structure, deemed necessary as a result of studies, should have been completed. In the interim, a detailed emergency action plan must be developed and implemented during periods of unusually heavy precipitation. Also, around-the-clock surveillance of the structure must be provided during these periods.

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LONG ISLAND BASIN

HEMPSTEAD LAKE DAM

NASSAU COUNTY, NEW YORK INVENTORY NO. N.Y. 108

PHASE I INSPECTION REPORT NATIONAL DAM SAFETY PROGRAM



NEW YORK DISTRICT CORPS OF ENGINEERS

JULY 1981

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D. C., 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
HEMPSTEAD LAKE DAM
I.D. NO. N.Y. 108
D.E.C. NO. 193
LONG ISLAND BASIN
NASSAU COUNTY, N.Y.

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PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

NAME OF DAM

Hempstead Lake Dam, NY 108

STATE LOCATED

New York

COUNTY LOCATED

Nassau

STREAM

Mill River

BASIN

Long Island

DATE OF INSPECTION

March 13, 1981

ASSESSMENT

The examination of documents and the visual inspection of Hempstead Lake Dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped for all storms exceeding approximately 2 percent of the PMF. The overtopping of the dam could cause the erosion of both abutments and the downstream face of the dam resulting in dam failure, thus significantly increasing the hazard to the loss of life downstream. The spillway is therefore adjudged as "seriously inadequate" and the dam is assessed as unsafe, non-emergency.

The classification of "unsafe" applied to a dam because of a "seriously inadequate" spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean that there appears to be a serious deficiency in spillway capacity and if a severe storm were to occur, overtopping and failure of the dam could take place, significantly increasing the hazard to loss of life downstream of the dam.

It is therefore recommended that within 3 months of notification to the owner, detailed hydrologic/hydraulic investigations of the structure should be undertaken to more accurately determine the site specific characteristics of the watershed and their affect upon the overtopping potential of the dam. The results of these investigations will determine the appropriate remedial measures which will be required to achieve a spillway capacity adequate to discharge the outflow from at least the one-half PMF. Within 12 months of the date of notification to the owner, modifications to the structure, deemed necessary as a result of studies, should have been completed. In the interim, a detailed emergency action plan must be developed and implemented during periods of unusually heavy precipitation. Also, around-the-clock surveillance of the structure must be provided during these periods.

In addition, the dam has a number of problem areas which, if left uncorrected, have the potential for the development of hazardous conditions and must be corrected within one year. These are:

- 1. The gates for the low level outlets should be repaired and made operable.
- 2. The brush, saplings and debris should be removed from the downstream slope. All coniferous trees should be removed while larger hardwood trees should not be removed, but should be inventoried and their condition monitored. If a tree dies, the area around the tree should then be monitored for possible seepage. A program of periodic mowing and cutting should be provided.
- 3. All trees and brush on the upstream face should be removed and periodic mowing and cutting provided.
- 4. Slope paving stones missing from the upstream face should be replaced.
- 5. The aqueduct and outlet pipelines should be carefully inspected and their capacity confirmed.
- 6. Provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of the reservoir drain sytem. Document this information for future reference. The emergency action plan described in section 7.1d should be maintained and updated periodically during the life of the structure.

Eugene O'Brien, P.E. New York No. 29823

Approved by:

Col. W.M. Smith, Jr

New York District /Engineer

Date:



1. OVERVIEW OF DAM

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
HEMPSTEAD LAKE DAM
I.D. NO. N.Y. 108
D.E.C. NO. 193
LONG ISLAND BASIN
NASSAU COUNTY, N.Y.

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

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a. Authority
The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers by Contract No. DACW 51-81-C-0008 dated 14 December 1981 in fulfillment of the requirements of the National Dam Inspection Act, Public Law 92-367, 8 August 1972.

b. Purpose of Inspection
The inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPITON OF THE PROJECT

a. Description of the Dam and Appurtenant Structures
The Hempstead Lake Dam is composed of an approximately 1,200 foot long earth embankment. The crest of the dam
is 74 feet wide and its maximum height above the river is 24
feet. The upstream face of the dam is paved with stone and the
upper part of the dam has a slope of lV:lH, while the lower part
of the dam has a slope of lV:3H. The downstream slope of the
dam varies non-uniformly due to highway embankment fill which
has been placed over the years.

An intake tower located to the left of the center of the dam contains five gated openings at three different elevations. These intakes supply two 36-inch cast iron pipes which supply a horseshoe-shaped (6' Wide x 5" High) water supply aqueduct which passes under the dam. The gates are controlled from a house located at the top of the intake tower. Located below the gate-house within the tower are four uncontrolled spillway openings (6' Wide, 2'-2" High) which discharge into the same aqueduct as the low level water supply intakes.

- b. Location
 Hempstead Lake Dam is located on the Mill River in
 Hempstead Lake State Park near the Village of Rockville Centre,
 New York. Lake Drive near its intersection with Peninsula Boulevard, passes over the top of the dam.
- c. Size Classification
 The dam is 24 feet high and has a reservoir with a maximum storage capacity of 2,300 acre-feet and therefore is classified as an intermediate dam (storage capacity >1,000 acre-feet, <50,000 acre-feet).
- d. Hazard Classification
 The dam is in the "high" hazard potential category because of its location within a developed suburban area and the close downstream proximity of major highways and residences.
- e. Ownership
 Hempstead Lake Dam is owned by the New York City
 Bureau of Water Supply. The person to contact is Mr. Edward
 Conway, Acting Borough Engineer, Queens at 119-45 Union Turnpike, Forest Hills, New York, 11375, Telephone Number (212)
 520-3467.
- f. Purpose of Dam
 The dam impounds water as part of the New York City
 Water Supply. The water has not been used for this purpose,
 however, in several years.
- g. Design and Construction History
 The dam was designed and constructed in 1873 for
 the Brooklyn Water Company. The designer and constructors
 are not known.
- h. Normal Operating Procedure
 There is no normal operating procedure nor records of past operating procedures.

Drainage Area, Square Miles 14.9

1.3 PERTINENT DATA

1	Dischause of Domeite of	
b.	Discharge at Damsite, cfs	
	Ungated Spillways Inlets	
	Maximum Capacity - Two 36-Inch	
	CI Pipes	320
	Total Discharge Maximum Pool	320

c. Elevation, Feet Above MSL,
USGS Datum
Top of Dam 34.0
Maximum Pool 34.0

	Spillway Crest Invert Water Supply Intake 1 Invert Water Supply Intake 2 Invert Water Supply Intake 3 Invert Water Supply Intake 4 Invert Water Supply Intake 5	29.0 18.0 18.0 13.9 12.5
d.	Reservoir Length of Normal Pool (Feet) Surface Area of Maximum Pool	5000
	(Acres) Surface Area of Normal Pool	183.3
	(Acres)	149.4
e.		
	Reservoir at Spillway Crest	1400
	Reservoir at Maximum Pool	2300
f.	Dam	
	Туре	Earth Embankment
	Length (Feet)	1,200
	Upstream Slope	Paved with Stone Upper lV:lH Lower lV:3H
	Downstream Slope	Varies Non-uniformly
	Crest Elevation (MSL)	34
	Crest Width (Feet)	74
	Grout Curtain	None
	Cutoff	"Puddled" to El -13
		(unknown material)
g.	Spillway	
	Туре	Uncontrolled Overflow Slots into Outlet Works
	Size	4 0 6 ft wide x 2'2" high
	Crest Elevation (MSL)	29
	Upstream Channel	None
	Downstream Channel	Horseshoe Aqueduct
		6" wide x 5' high
h.	Reservoir Drain and Pipelines	
	Upstream - An intake tower is lo	cated on the up-

h. Reservoir Drain and Pipelines

Upstream - An intake tower is located on the upstream face of the dam slightly to the left of center of the dam. There are five intakes at three different elevations (see Table) which eventually supply a horseshoe-shaped aqueduct with a six foot wide base and a maximum height of five feet.

				Di	mei	ns:	ions		Inver	t Elev.
Water	Supply	Intake	1	2'9"	W	x	3'3"	H	18'	MSL
Water	Supply	Intake	2	2'9"	W	x	3'3"	H	18'	MSL
Water	Supply	Intake	3	2'9"	W	X	2'9"	H	13.9'	MSL
Water	Supply	Intake	4	2'9"	W	X	2'9"	Н	12.5'	MSL
Water	Supply	Intake	5	2'9"	W	x	2'9"	H	12.5'	MSL

The intake discharges into a common chamber 6 feet x 20 feet. From the chamber, two 36-inch diameter cast iron outlet pipes about 38 foot long joint and enter a brick horseshoe-shaped aqueduct. The aqueduct can provide discharges into either the NYC Water Supply System or into South Pond located about 1/4 mile downstream

SECTION 2 - ENGINEERING DATA

2.1 GEOLOGY

3

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The records of the owner contain no data on site geology. However, there is data available in the literature on the general geology of the area. The Hempstead Lake Dam is located in the northeast portion of the Atlantic Coastal Plain Physiographic Province. This province is characterized by sediments which lack a definite coherence. The area around Hempstead Lake Dam is characteristic of the south shore of Long Island exhibiting topography of very low relief and consisting of glacial outwash plain sediments of clayey sand, sand and gravel deposits. These Quaternary deposits overlie the Magothy Formation of the Upper Cretaceous. These are also primarily clayey sand, sand and gravel.

2.2 SUBSURFACE INVESTIGATIONS

There are no records of subsurface investigations carried out at the site. It is known that the surficial soils in the vicinity of the Hempstead Lake Dam are glacial outwash plain clayey sands, sands and gravels.

2.3 DAM AND APPURTENANT STRUCTURES

There are no records or drawings available with regard to the original construction of the dam in 1873. There is only a sketch of a typical section and some property ownership plans. No records are available of the subsequent changes to the crest width.

2.4 CONSTRUCTION RECORDS

No information has been located in relation to the construction of the project. The name(s) of the contractor(s) is (are) unknown.

2.5 OPERATION RECORDS

In recent years there has been no regular operation of the dam and no records are kept of reservoir operation. The dam is monitored and routine maintenance is carried out by the Long Island State Park Commission (LISPC). No systematic monitoring of the performance of the dam is in effect.

2.6 EVALUATION OF DATA

There is sufficient data available to support a Phase I evaluation of the dam.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

The visual inspection of the Hempstead Lake Dam was made on 13 March 1981. The weather was clear and the temperature was in the low fifties. At the time of the inspection, the lake level was at two uppermost lowlevel water supply inlets, El 18, about 11 feet below the spillway crest.

b. Dam

The earth embankment appears to be in good condition. The vertical and horizontal alignment of the crest appears to be good (see Photograph 2). The crest width of the dam has been widened (to 74 feet) from the original design width (24 feet) to accommodate a highway.

The upstream slope shows no signs of erosion or distress. The stone paving is in good condition with only a few stones missing and some small (3-inch) trees growing near the crest through joints. Additionally, there is some minor sediment buildup on the upstream face near the left abutment.

The downstream slope of the dam has been altered as a result of the widening of the crest. The resulting slope is non-uniform with its steepest section on the upper portions of the dam. The downstream slope is completely overgrown with undesirable brush and tree growth with trees of up to 18 inches in diameter. There is no sloughing or subsidence, although local depressions exist due to surface runoff along various footpaths perpendicular and parallel to the slope. No seepage was evident on the downstream slope.

There is no emergency action plan for the project.

c. Spillway
The visible portion of the overflows and tower which serve as a spillway are in good condition; it was not possible, however, to ascertain the condition of the tailraces.

d. Outlets and Pipeline
The upstream regulating gates of the water supply intakes and the reservoir drain are not in operating condition. The gates are rusted in position, the two upper gates are opened about six inches and the other three gates are rusted closed. The operating mechanisms are not operable. It was not possible to ascertain the condition of the outlet pipes or the brick aqueduct.

e. Abutments

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The abutment contacts and the abutments are in good condition. There does not appear to be any portion of the abutments lower than the crest elevation of the dam.

f. Reservoir Area

The reservoir area is located within the park bordered on its northern end by the Southern State Parkway. It is relatively flat land. There are neither slides, rockfalls or sloughing around the reservoir. There are only minor sedimentation problems visible.

3.2 EVALUATION OF OBSERVATIONS

Visual observations made during the course of the inspection did not indicate any serious problems which would adversely affect the adequacy of the dam and appurtenant facilities. The following is a list, in order of importance, of problem areas encountered which should be corrected before further deterioration results in a hazardous condition. Appropriate remedies are also included.

- 1. The gates for all outlets, which are rusted closed, and are inoperable, should be repaired.
- 2. Clear all brush, saplings and debris from the down-stream slope. All coniferous trees should be removed while larger hardwood trees should not be removed, but should be inventoried and their condition monitored. If a tree dies, the area around the tree should then be monitored for possible seepage. A program of periodic mowing and cutting should be provided.
- 3. All trees and brush on the upstream face should be removed and a program of periodic cutting provided.
- 4. Slope paving stones missing from the upstream face should be replaced.
- 5. The aqueduct and outlet pipelines should be carefully inspected and their capacity confirmed.
 - 6. Develop an emergency action plan for the project.

SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

No written operation and maintenance procedures exist for the project. There is no normal operation of the project.

4.2 MAINTENANCE OF THE DAM

There is no regular maintenance schedule for the dam. The responsibility for day-to-day maintenance of the dam reportedly belongs to the Long Island State Park Commission Staff.

4.3 WARNING SYSTEM IN EFFECT

No warning system is in effect or in preparation.

4.4 EVALUATION

The overall maintenance of the Hempstead Lake Reservoir is considered inadequate in the following areas:

- 1. The reservoir outlets are inoperable due to an absence of operation and maintenance.
- 2. Control of trees and vegetation on the downstream face and to a limited extent on the upstream face.
- 3. No formal operation and maintenance manuals exist for the project.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Hempstead Lake is located in the town of Hempstead, Nassau County, the State of New York (Hydrologic Unit Code 02030?02). It is situated in the Hempstead Lake State Park just south of the Southern State Parkway. The Hempstead Lake drainage area, as can be outlined on the USGS quadrangle map, is 14.9 square miles. However, as in the adjacent East Meadow Brook which has a similar drainage area as the Hempstead Lake basin, it is estimated that only 9.8 square miles of the basin contributes to the storm runoff at the lake. The remaining 5.1 square miles north of the Northern State Parkway consist mainly of largely forested estates, and all the precipitation in this area, even during intense storms, infiltrates into the highly permeable sandy ground.

It has been estimated that in the "effective drainage area", some 32 percent of the area is impervious due to the roads, buildings, etc. and that the construction of storage ponds, for aquifer recharge, accounts for about a 15 percent rainfall loss. This "effective drainage area" is almost 100 percent urbanized and is drained by a number of storm-sewer sub-basins, which may or may not discharge within the basin. The detailed evaluation of the impact of these storm-sewers on the flood hydrographs is outside the scope of this Phase I investigation.

5.2 ANALYSIS CRITERIA

The Hempstead Lake drainage basin is ungauged. However, the adjacent East Meadow Brook basin is gauged and a unit hydrograph has been developed for the 10 square mile Hempstead subarea. It is assumed, for the purposes of this study, that the basin characteristics are similar enough to transfer this unit hydrograph without any alterations. Loss parameters were estimated inaccordance with U.S.G.S. Professional Paper 627-F (Ref.1) to reflect the high infiltration capacity of the pervious soil found in this basin. (Initial loss 2.2 inches; constant loss 0.24 inches per hour.) The Probable Maximum Precipitation (PMP) was taken from the National Weather Service Mydrometeorological Report No. 33. In accordance with the "Recommended Guidelines for Safety Inspections of Dam", the adequacy of the spillway was analyzed using the Probable Maximum Flood (PMF). A multi-plan analysis was performed to test the spillway under the full, 0.75, 0.50 and 0.25 PMF.

5.3 SPILLWAY CAPACITY

The spillway at Hempstead Lake is included as part of the inlet tower works. The spillway consists of four arched

openings six feet wide with a maximum height of 26 inches. The four openings have an invert elevation of 29 feet. The capacity of the spillway is limited to the capacity of the two 36-inch low level outlet pipes (323 cfs).

5.4 RESERVOIR CAPACITY

The normal capacity of the Hempstead Lake is listed as 2,700 acre-feet (117.65 million gallons). However, it is estimated that the present capacity is about 1,400 acre-feet since the construction of the Southern State Parkway, which crosses through the original storage area. The computed surcharge storage between the spillway crest elevation (29.0 feet) and the top of the dam is 140 acre-feet, which is equivalent to approximately 0.17 inches of runoff over the "effective" drainage area.

5.5 FLOODS OF RECORD

There are no records available of floods of maximum lake elevations. However, it is reported that the dam has not been overtopped in the last 20 years.

5.6 OVERTOPPING POTENTIAL

The potential of the dam being overtopped was investigated on the basis of the spillway discharge capacity and the available surcharge storage to meet the selected design flood inflows.

The analysis was performed assuming that the lake level was at spillway crest elevation (29.0 feet) at the start of the flood event. The computed inflow peak (PMF) is 15,460 cfs. The HEC-1B computer analysis indicated that the spillway is capable of passing about 2 percent of the PMF without the dam being overtopped. A summary of the results are as follows:

RATIO OF PMF	PEAK INFLOW	PEAK OUTFLOW	OVERTOPPING	
1.00	15,460 cfs	15,370 cfs	2.54 ft	
0.75	11,600 cfs	11,520 cfs	2.09 ft	
0.50	7,730 cfs	7,610 cfs	1.57 ft	
0.25	3,870 cfs	3,700 cfs	0.94 ft	

5.7 EVALUATION

The dam does not have sufficient spillway capacity to pass either the PMF or one-half (1/2) PMF, without overtopping the dam. The overtopping of the dam could cause the failure of the dam, thus significantly increasing the hazard for the loss of life downstream. The spillway is, therefore, assessed as "seriously inadequate" and the dam is assessed as unsafe, non-emergency.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

- a. Visual Observations
 Visual observations did not indicate any structural problems with the embankment or appurtenant structures with the reservoir at its present level. There seems to be no adverse conditions which would affect the stability of the dam at the present time.
- b. Design and Construction Data
 Design and construction data is limited to a sketch
 of a typical original cross section of the dam. There are no
 design calculations or construction data available.

On the basis of performance, visual inspection as well as engineering judgment, the embankment and appurtenant structures appear to be adequate with the reservoir at its present level.

- c. Operating Records
 There are no operating records kept or available.
 There are no records or reports of any operational problems which would effect the stability of the dam.
- d. Post-Construction Changes
 It is reported that the dam was constructed in 1873
 as shown on the sketch included in the drawings. Subsequent
 to the construction, at some unknown date, the crest was widened
 to 74 feet. Details of the changes are not available.

Visual observations, performance and engineering judgment indicate that the changes do not adversely effect the stability of the dam with the reservoir at its present level.

- e. Stability Analysis
 There is no concrete gravity structure, therefore the recommended Phase I guidelines do no warrant a structural stability analysis.
- f. Seismic Stability
 The dam is located in Seismic Zone 1 and in accordance with recommended Phase 1 guidelines, does not warrant seismic analysis.

SECTION 7 - ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

Examination of available documents and a visual inspection of the dam and the appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped for all storms exceeding approximately two percent of the PMF. The overtopping of the dam could cause the erosion of the abutments and the downstream face of the dam resulting in dam failure, thus significantly increasing the hazard for loss of life downstream. The spillway is therefore adjudged as "seriously inadequate" and the dam is assessed as unsafe, non-emergency.

The classification of "unsafe" applied to a dam because of a "seriously inadequate" spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean, however, that based on an initial screening and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to loss of life downstream from the dam.

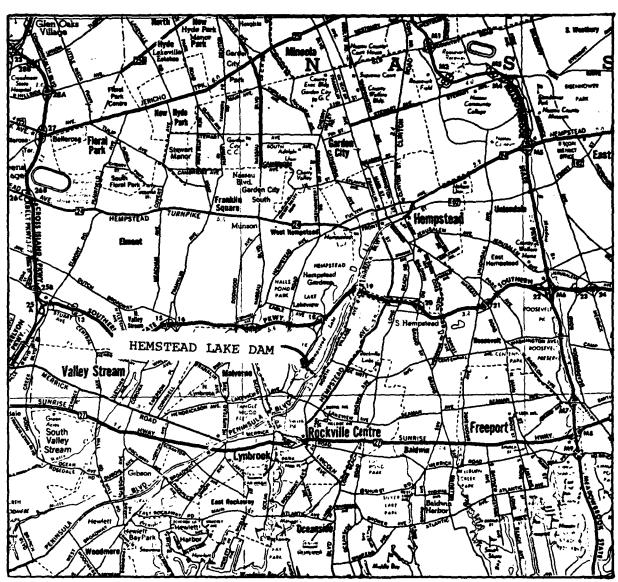
- b. Adequacy of Information
 The information and data available were adequate
 for performance of this investigation, except as noted in Section 6.1c.
- c. Need for Additional Investigations
 Since the spillway is considered to be "seriously inadequate", additional hydrologic/hydraulic investigations are required to more accurately determine the site specific characteristics of the watershed. After the in-depth hydrologic/hydraulic investigations have been completed, remedial measures must be initiated to provide spillway capacity sufficient to discharge the outflow from the one-half (1/2) PMF event.
- d. Urgency
 The additional hydrologic/hydraulic investigations
 which are required must be initiated within 3 months from the
 date of notification. Within 12 months of notification, remedial
 measures as a result of these investigations must be initiated,

with completion of these measures during the following year. In the interim, develop an emergency action plan for the notification of downstream residents and proper governmental authorities in the event of overtopping, and provide around-the-clock surveillance of the dam during periods of extreme runoff. The other problem areas listed below must be corrected within one year from notification.

7.2 RECOMMENDED MEASURES

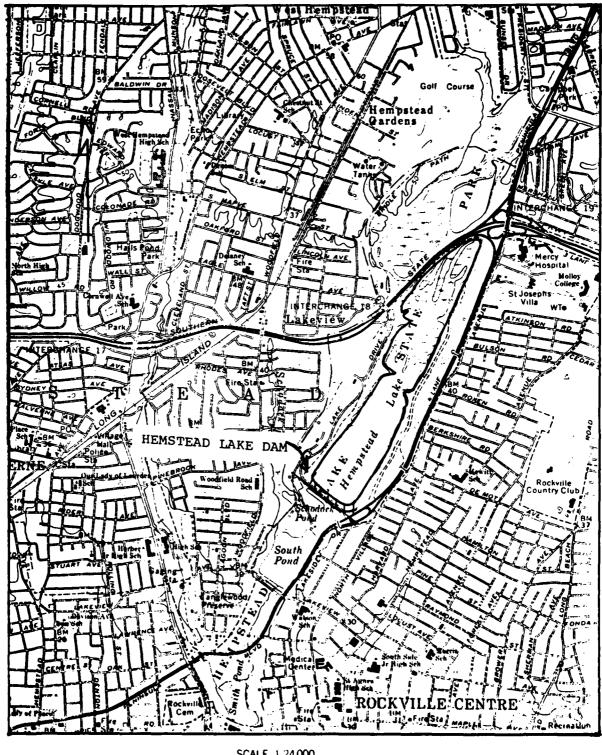
- 1. The gates for all low level outlets should be made operable.
- 2. Clear all brush, saplings and debris from the down-stream slope. All coniferous trees should be removed, while larger hardwood trees should not be removed but should be inventoried and their condition monitored. If a tree dies, the area around the tree should then be monitored for possible seepage. A program of periodic mowing and cutting should be provided.
- 3. All trees and brush on the upstream face should be removed and periodic mowing and cutting provided.
- 4. Slope paving stones missing from the upstream face should be replaced.
- 5. The aqueduct and outlet pipeline should be carefully inspected and their capacity confirmed.
- 6. Provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of the reservoir outlet system. Document this information for future reference. The emergency action plan described in Section 7.1d should be maintained and updated periodically during the life of the structure.

DRAWINGS



Scale 1" = 1.3 miles

HEMSTEAD LAKE DAM VICINITY MAP

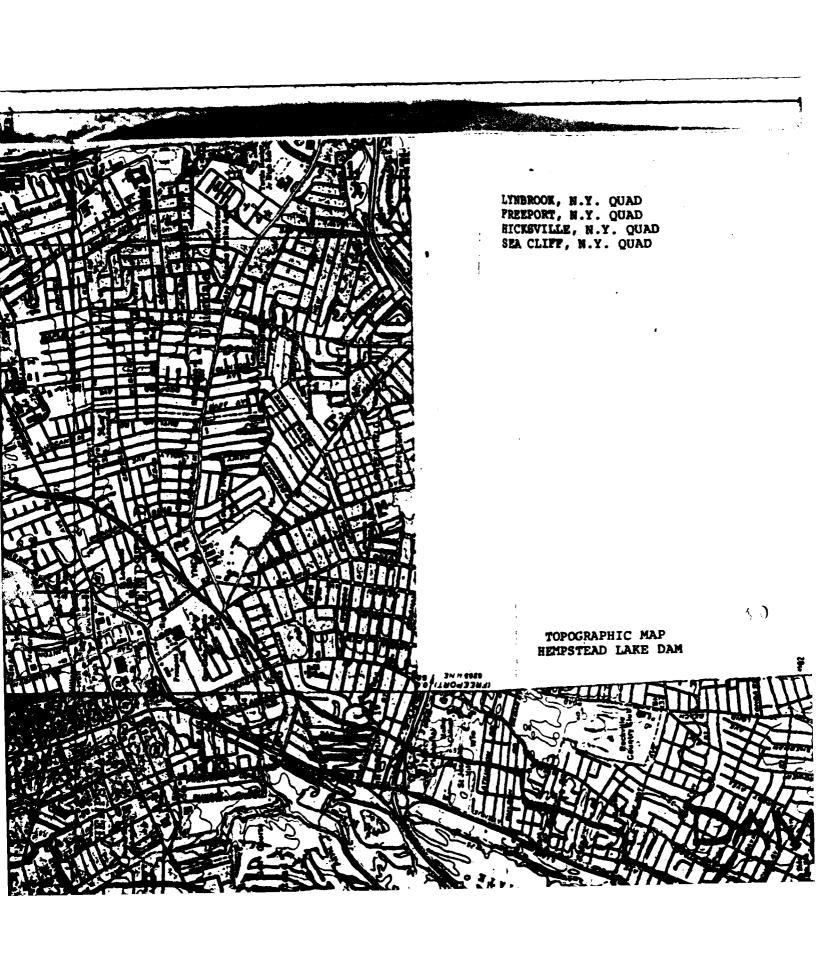


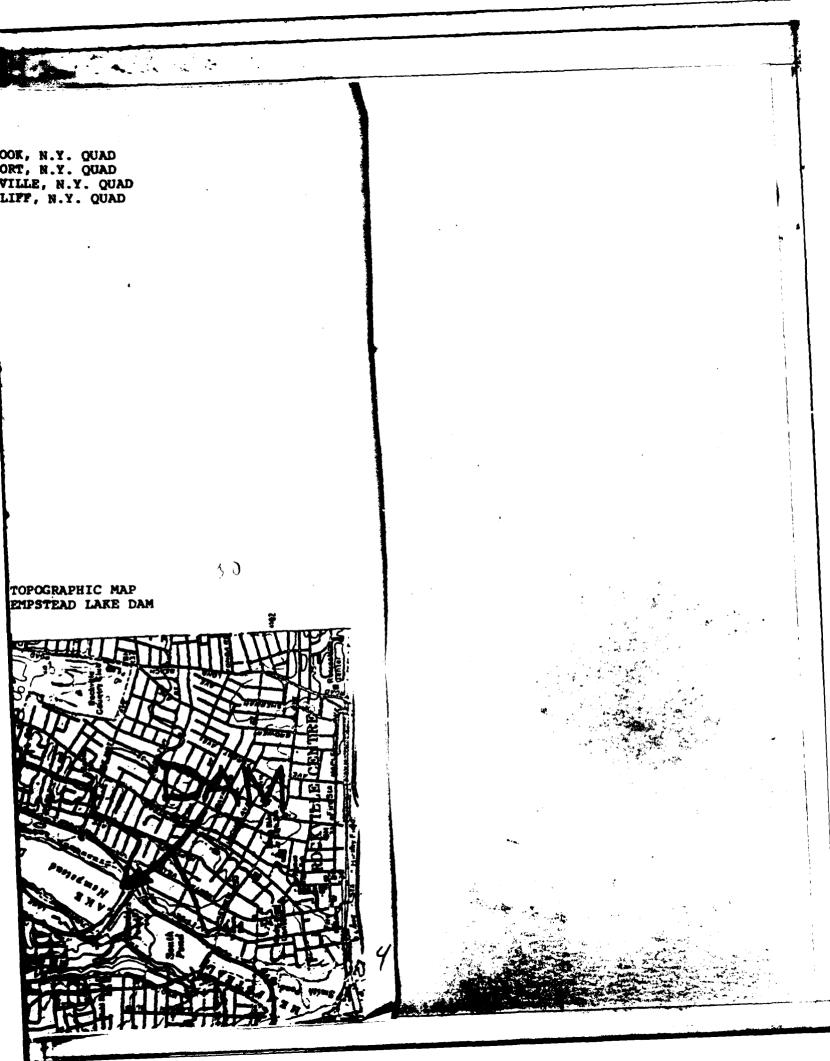
SCALE 1 24 000

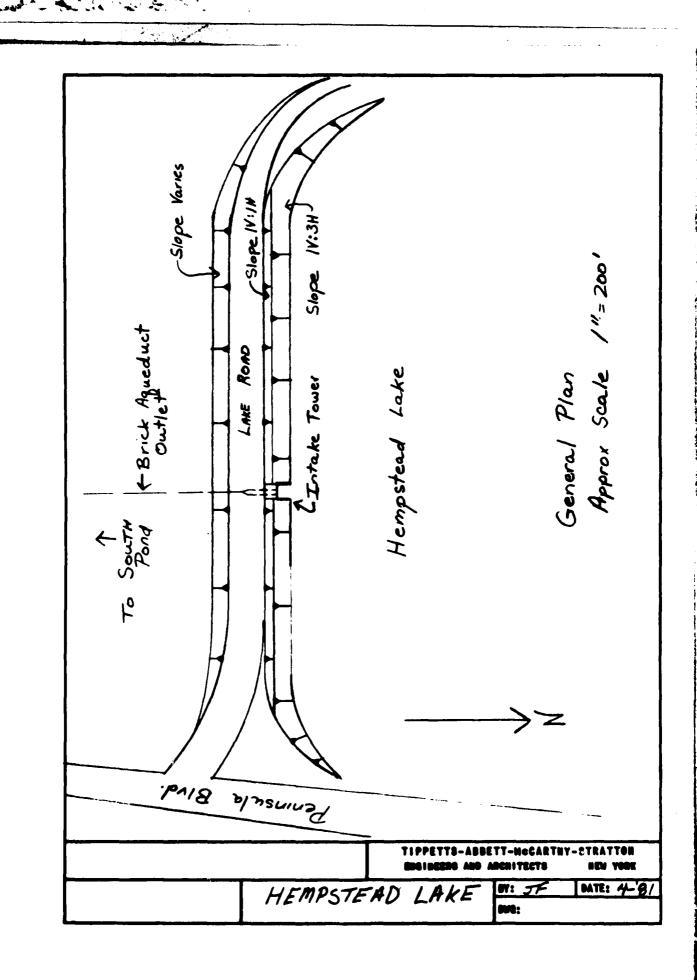
1 0 1000 2000 3000 4000 5000 6000 7000 FEET

LYNBROOK, NEW YORK QUAD TOPOGRAPHIC MAP
HEMSTEAD LAKE DAM



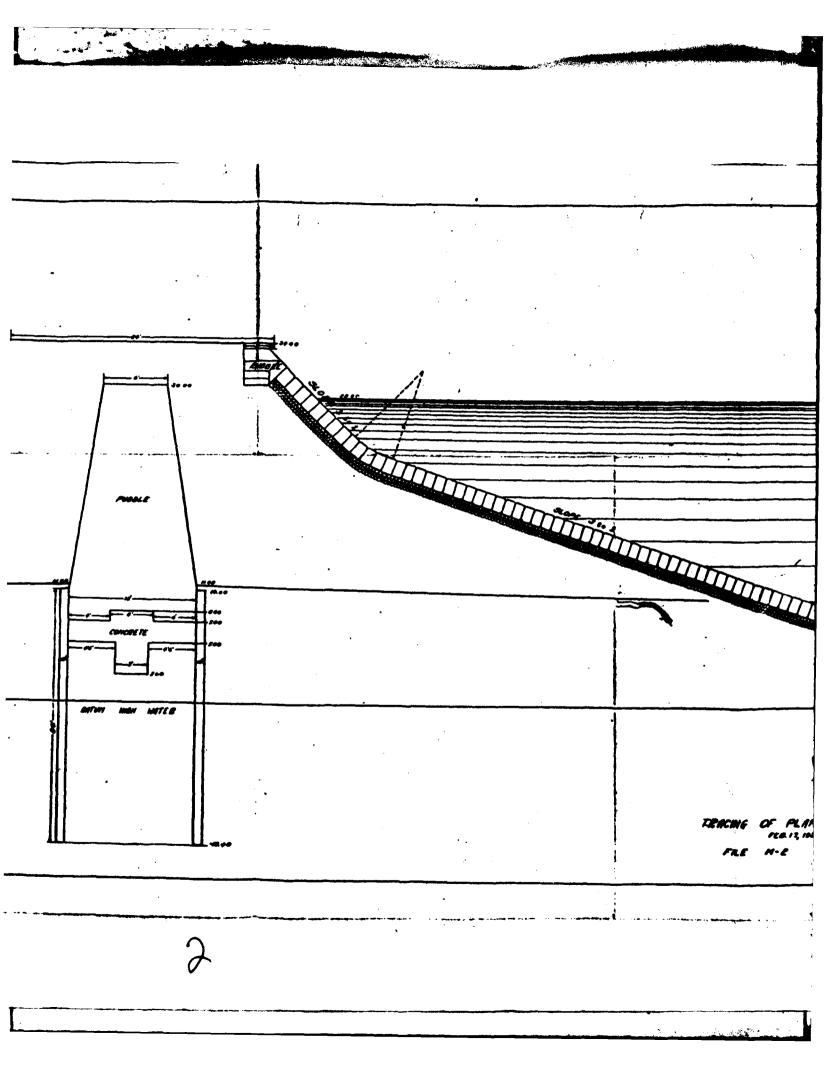






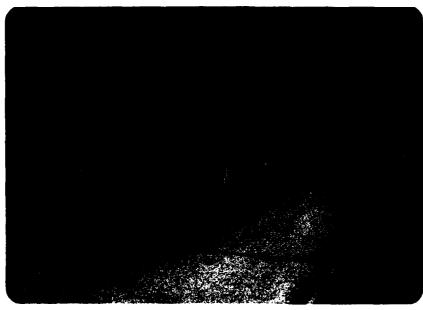
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STORAGE RESERVOIR SECTION DAM EMBANKMENT SCALE #



,LI PHOTOGRAPHS

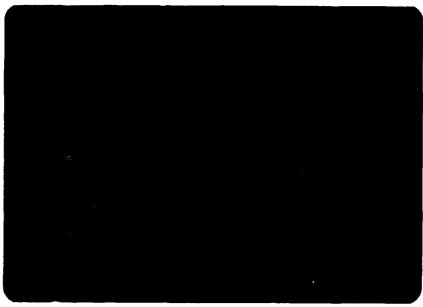
APPENDIX B



2. VIEW OF CREST LOOKING TOWARDS RIGHT ABUTMENT



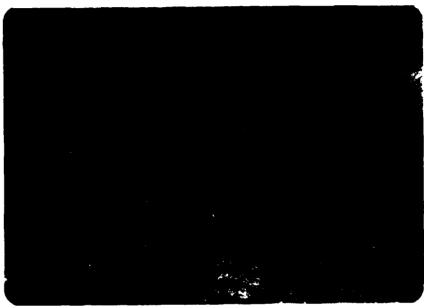
3. VIEW OF UPSTREAM SIDE OF DAM



4. VIEW OF UPSTREAM FACE LOOKING TOWARDS RIGHT ABUTMENT FROM GATEHOUSE



5. VIEW OF UPSTREAM FACE LOOKING TOWARDS LEFT ABUTMENT FROM GATEHOUSE



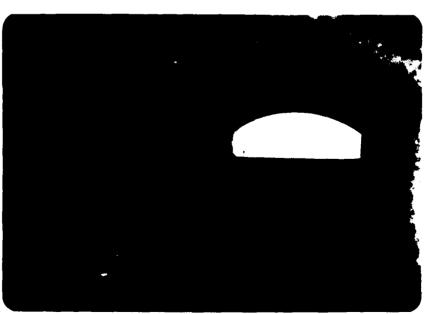
6. VIEW OF DOWNSTREAM FACE OF DAM



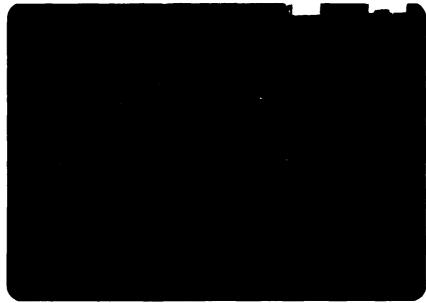
7. OUTLET OF AQUEDUCT FROM HEMPSTEAD LAKE AT SOUTH POND



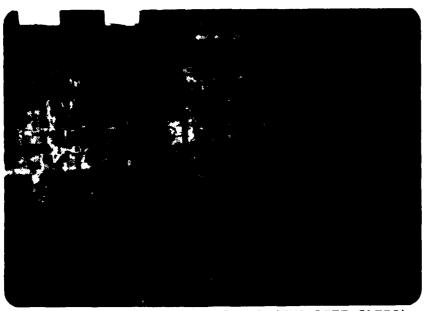
8. VIEW OF GATE-HOUSE SHOWING EMERGENCY SPILL-OVER INLETS



9. VIEW OF SPILLOVER INLETS AND INTERIOR OF INTAKE STRUCTURE



10. CONTROL VALVES FOR GATES (TWO RIGHT GATES)



11. CONTROL VALVES FOR GATES (TWO LEFT GATES)



12. TWO UPPERMOST LOW LEVEL WATER SUPPLY INLETS

VISUAL INSPECTION CHECKLIST

APPENDIX C

VISUAL INSPECTION CHECKLIST

TO THE PARTY OF TH

L)	Bas	sic Data
•	a.	General
		Name of Dam Hempstead Lake Dom
Ī		Fed. I.D. # <u>N9 108</u> DEC Dam No. <u>234-193</u>
L		River Basin Long Island
		Location: Town Rockville Centre County Nassau
		Stream Name Mill River
		Tri! itary of
[Latitude (N) 40-40.4 Longitude (W) 73-38.9
	-	Type of Dam Earth
		Hazard Category HIGH (1)
ľ		Date(s) of Inspection March 13, 1981
1.		Weather Conditions <u>Sunny - Temp. LOW</u> 50°F
I		Reservoir Level at Time of Inspection
•	ь.	Inspection Personnel Harvey Feldman, Joe Fiten, JR
L		
Γ.	· c. ,	Persons Contacted (Including Address & Phone No.) MR Art LARSon
L	•	N.U.C. Buren of Water Supply, 119-45 Union TPK, Forest
		Hills, N.y. 11375.(212) 520-3467. Also MR Ed Conway at
Ti.		some address.
L	٠.	MR. Leonard Van Cott, Maintenance Assis LISPC. Hempskedlake State Park
I	d.	History:
_		Date Constructed July 1872 Date(s) Reconstructed
	•	
E		Designer Not known
	•	Constructed By Not Known
		owner New York City
-		J '

npankme Cha	
	Embankment Material <u>Granulas with impervious</u>
(1)	·
(2)	Cutoff Type Walled Cutoff trench with puddled"
(2)	
	fill, type unknown
, (3)	Impervious Core yes but motorial type not known
(II)	Internal Duainage Sustan NAXIA
. (4)	Internal Drainage System
-(5)	Miscellaneous <u>See</u> Sketch
	indecimination of the second o
. Cres	*
	Vertical Alignment 9000
(2)	Horizontal Alignment good, not the orginal as shows
(-)	Dlan # 784, Crest has been widowed to 74' hraddin
(3)	Plan # 784, Crest her been widowed to 74' hyadding foods cracks None Visible
:	
(4)	Miscellaneous Crest width his been tripled to
	accomodate highway
Upst	ream Slope
(1)	Slope (Estimate) (V:H) Upper IV:1H, Lower 3V:1H
(2)	Undesirable Growth or Debris, Animal Burrows Few Small trees
•	growing through stone saving
(3)	Sloughing, Subsidence or Depressions <u>None Visible</u>
•	
	•

The second second

(5)	Surface Cracks or Movement at Toe None VISIble
•	
Down	nstream Slope
(1) (2)	Slope (Estimate - V:H) //:/# originally 10:24, Changed due to Widening of crest for highway. Undesirable Growth or Debris, Animal Burrows Fully overgrown with
	Etrees up to 18" d.
(3)	Sloughing, Subsidence or Depressions No Sloughing or Subside
•	Some depressions due to footpaths (parallel Eperpi
,	and Sarface dramage running in Footpaths
(4)	Surface Cracks or Movement at Toe None evident
(5)	Seepage None Puldent
(6)	External Drainage System (Ditches, Trenches; Blanket)
	None
(7)	Condition Around Outlet Structure Outlet Structure
	not visible
(8)	Seepage Beyond Tue None evident
Abut	ments - Embankment Contact
	(rood

Sheet 3

The state of the state of

•	
(2)	Secpage Along Contact None
•	
•	
Drainage	
a. Desc	ription of System None
	
	•
• •	
b. Cond	ition of System
e. Disc	harge from Drainage System
e. Disc	harge from Drainage System
c. Disc	harge from Drainage System
Instrume	ntation (Momumentation/Surveys, Observation Wells, Weirs, ters, Etc.) Alone present
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5)	Res	<u>ervoir</u>
T	2.	Slopes Wery minor relief in the area- No large Slows
		small sloped are stable
E	ъ.	Sedimentation Some fine sould on upstream
<u>.</u>		face, particularly near left abarment.
1.	c.	Unusual Conditions Which Affect Dam <u>Inflou</u> to reservoir
ľ	•	trom overflow of reservoirs to north through compails
l. ₆₎	<u>Λre</u>	a Downstream of Dam
		Downstream Hazard (No. of Homes, Highways, etc.) High - Dam
	b.	Major highways and two smaller dans, Seepage, Unusual Growth Some growth drinsfream
		Total
(c.	Evidence of Movement Beyond Toe of Dam
T.	. d.	Condition of Downstream Channel No downstream channel
[7)	<u>Spi</u>	llway(s) (Including Discharge Conveyance Channel)
	5,	pillways" consist of overflows in outlet works and therefore
1.		ischarge into Aquaducts.
1	3.	General Spillways are four high level uncontrolled
1.		brondcrested openings in outlet works Discharge
		15 into Aqueduct works
C .		
E.	ъ.	Condition of Service Spillway Not known.
		Openings are the only visible part of spillway
n		there are in good condition.
U		
•		Sheet 5
	•	

THE REPORT OF THE PARTY OF THE

2.	Condition of Auxiliary Spillway None
	•
i. '	Condition of Discharge Conveyance Channel Not Visible, port
	of Aqueduct System.
	ervoir Drain/Outlet
•	Type: Pipe Conduit Other Horshoe Aquedu
	Material: Concrete Metal Other Brick
	Size: 6 basewidth 4/2 MANHAGHZength unknown & 14mile minimu
	Invert Elevations: Entrance 2 10 ftms/ Exit 25' MS/
	Physical Condition (Describe): Unobservable
	Material: Not Visible
	Joints: Alignment
	Structural Integrity:
•	Jiydraulic Capability:
•	Mydradic Cupublicy.
	Means of Control: Gate 5 gaks Valve Uncontrolled
	Occupations Openable Transmitted Officer
	Operation: Operable Inoperable Other
	Present Condition (Describe): gates are rusted in positions of Missing etc. Not Maintained

Sheet 6

	Concrete Surfaces See Hems 7 and 8
	•
	Structural Cracking See Hems 7, and 8
	ottuctural ordening
	Movement - Norizontal & Vertical Alignment (Settlement)
	Junctions with Abutments or Embankments NA
•	
•	
	Drains - Foundation, Joint, Face /// A
	Drains - Foundation, Joint, Face
	Drains - Foundation, Joint, Face
	Drains - Foundation, Joint, Face NIA
•	Drains - Foundation, Joint, Face NIA
•	Drains - Foundation, Joint, Face NIA Water Passages, Conduits, Sluices See Jeens 7. and 8
•	
•	
•	
•	
	Water Passages, Conduits, Sluices <u>See Jems 7. and 8</u>
	Water Passages, Conduits, Sluices <u>See Jems 7. and 8</u>
	Water Passages, Conduits, Sluices <u>See Jems 7. and 8</u>
	Water Passages, Conduits, Sluices <u>See Jems 7. and 8</u>
•	Water Passages, Conduits, Sluices <u>See Jems 7. and 8</u>
•	Water Passages, Conduits, Sluices <u>See Jems 7. and 8</u>

				
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Foundation	NJA			
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Noutments	NIA	·		·
Control Gates	See	Itemis 8	<u> </u>	
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	(Plunge Pool, et	c.)	; /;	
Cnergy Dissipators	(Plunge Pool, et	c.)	; /;	
Cnergy Dissipators	(Plunge Pool, et	c.)	; /;	
Energy Dissipators Intake Structures	(Plunge Pool, et	c.)	; /;	
Cnergy Dissipators	(Plunge Pool, etc	c.)	; /;-	
Energy Dissipators Intake Structures Stability	(Plunge Pool, etc	c.)	; /;-	
Energy Dissipators Intake Structures	(Plunge Pool, etc.) See	c.)	; /;-	

a. Description and Cond	lition	Vo Appurtenan
Structures preser	<i>1</i>	- , -,-
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HYDROLOGIC DATA AND COMPUTATIONS

APPENDIX D

CHECK LIST FOR DAMS HYDROLOGIC AND HYDRAULIC ENGINEERING DATA

AREA-CAPACITY DATA:

	•	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1)	Top of Dam .	+34.0	179	2300
2)	Design High Water (Max. Design Pool)			· ·
	Auxiliary Spillway Crest	None		
4)	Pool Level with Flashboards	None	•	
5)	Service Spillway Crest	+ 29.0	148	1400

DISCHARGES

•	DISCIPINGES	Volume (cfs)
1)	Average Daily .	unknown
2)	Spillway @ Maximum High Water	323
3)	Spillway @ Design High Water	unknown
4)	Spillway @ Auxiliary Spillway Crest Elevation	unknown
5)	Low Level Outlet	unknown . capacity coincident with
6)	Total (of all facilities) @ Maximum High Water	Spillwax Capacity.
·'7)	Maximum Known Flood	unknown
8)	At Time of Inspection	Nme

CREST:	•			ELEVATION: 34 F	<u>t</u>
Type:	CAdon !	Paved	Rosa	lusiy	
				: 1200 Ft	
Spillover P	IRT OF	OUTLET	r w	ORKS	
Location IN	Tower				
SPILLWAY:			•	·	
SERVICE				AUXILIARY	
NON	<u>e</u>	Elevati	on	+ 29,0'	
		_ Туре	4	Brood Crested Sin	ls.
		Width		6.0ft x4	
	<u>Ty</u>	pe of Cont	rol_	·	
		Uncontroll	ed		
		Contro!le	 d:		
		Type			
	(Flas	hboards; g	ate)	· · · · · · · · · · · · · · · · · · ·	
· · · · · · · · · · · · · · · · · · ·	·	Number		• .	
	•	<u>S</u> ize/Lengt	h		
	Inv	ert Materi	al		
		cipated Le erating se			
		hute Lengt	h	Not Known)
	Height B & Appr	etween Spi Oach Chann (Weir Flo	el Inve	rest <u>~10f</u>	<u>ن</u> ج-

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HYDROMETEROLOGICAL GAGE	s: None Used in Calcs.
Туре :	
Location:	•
Records: NONE A	MAILABLE
Date -	
Max. Reading	-
FLOOD WATER CONTROL SYSTEM:	
Method of Controller	d Releases (mechanisms):
5 Low	Level Outlets in Tower fee
	Brick Aqueduct
· ————	

FUEL DE VINE A

RATRAGE	E AREA: 14.9 sq. miles
RAINAGE	BASIN RUNOFF CHARACTERISTICS:
Land	1 Use - Type: URBAN
•	rain - Relief: Flat
Surf	face - Soil: Highly Permeable Sandy Soil
,	off Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)
•	Urban development is estimated to cover 3
	of basin (roads, parking lots etc). Natural rung
	affected by Storm Sewers and detention basis
Pote	ntial Sedimentation problem areas (natural or man-made; present or fut
	Unknown
Pote	ntial Backwater problem areas for levels at maximum storage capacity
•	including surcharge storage:
	Parkway Constructed Across original
	reservoir, potential for backwater in
	this area
Dike	s - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter: Name Observed
	Location:
	Elevation:
Rese	rvoir:
Rese	Length @ Maximum Pool <u>12</u> (Miles)

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TAMS

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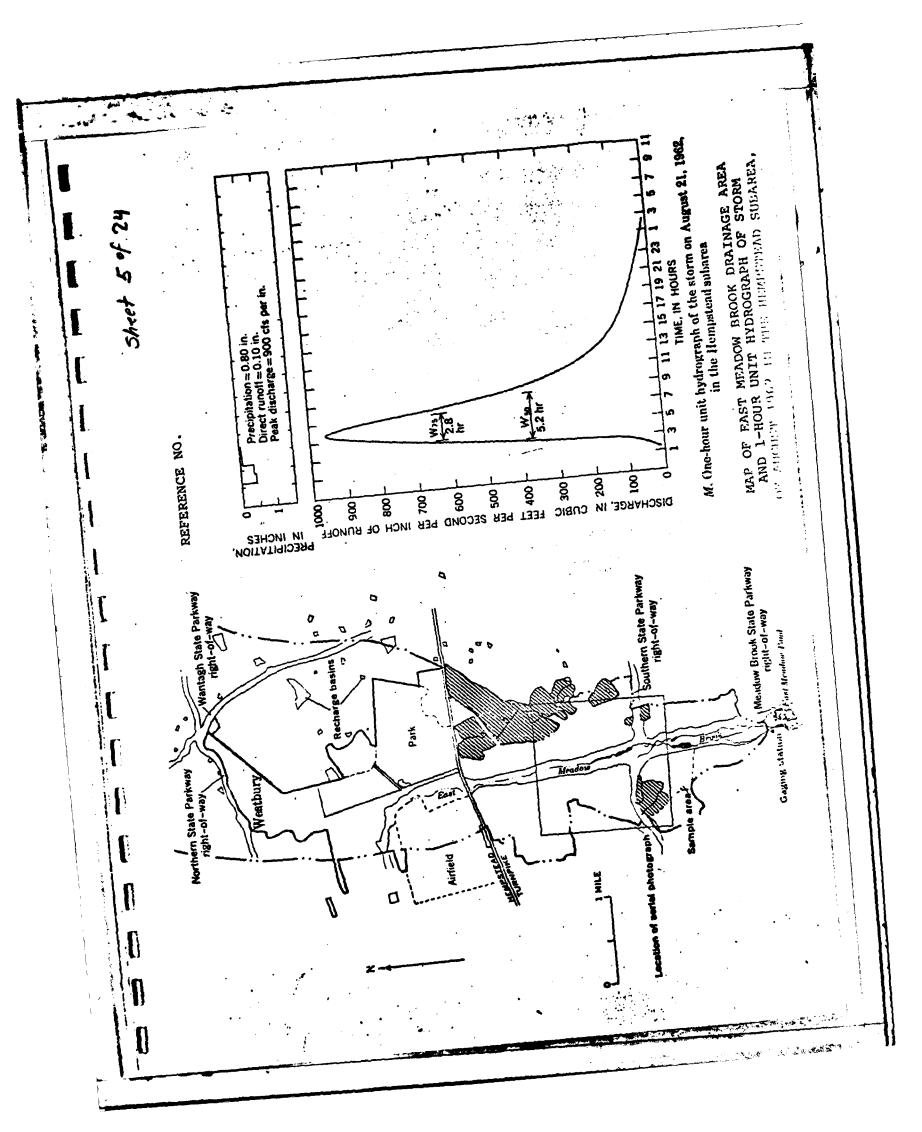
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OTHER DATA

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THE PERSON NAMED IN

STATE OF NEW YORK DEPARTMENT OF

State Engineer and Surneyor

Report of a Structure Impounding Water

| To assist in carrying out the | provisions of Section 22 of the Cons | ervation Law, being Chapter LXV of the |
|--------------------------------------|--|---|
| Consolidated Laws of New York | State, relating to safeguarding life and | property and the crection, reconstruction, |
| or maintenance of structures for in | pounding water, owners of such structu | res are requested to fill out as completely |
| as possible this report form for ea | ch such dam or reservoir owned within | the State of New York for which no plans |
| or reports relative thereto are on | file in this Department, and to return | this report form, together with prints or |
| | pstead Storage Reservoi | |
| | | xxx: Long Island in the |
| Town of Hempstead | County of Nassau | xxxx New York, |
| about halfway betwe | | Hempstead. |
| 2. Is any part of the structu | re built upon or does its pond flood any | State lands? NO. |
| | • • | w York |
| | | ter supply. |
| . 5. The material of the right | bank, in the direction with the current | , is; at the |
| | | inches vertical to a foot horizontal on the |
| | | feet, and the top surface extends |
| | feet above the spillway crest. | |
| | • • • | |
| 6. The material of the left | bank is | ; has a top slope ofinches |
| to a foot horizontal, a thickness of | offeet and a height of | feet. |
| 7. The natural material of the | he bed on which the structure rests is (| clay, sand, gravel, boulders, granite, shale, |
| slate, limestone, etc.) sand a | nd_gravel | • |
| • | | |
| | | |
| * | | |
| | • | rdness, perviousness, water bearing, effect |
| of exposure to air and to water, un | niformity, etc | ., |
| • | and the second s | |

| of the | layers in a plane perpendicular to the horizontal outcropping? |
|--|---|
| 10 | . What is the thickness of the layers: |
| I | Are there any porous scams or fissures? |
| | The watershed at the above structure and draining into the pond formed thereby issquare miles. |
| . 13 | . The pond area at the spillway crest elevation is 237.6 acres and the pond impounds 117.647 leet of water. |
| 14 | . The maximum known flow of the stream at the structure wascubic feet per second on |
| 15 | . Has the spillway capacity ever been exceeded by a high flow? NO. |
| | in any possible flood flow from the pond otherwise than through the wastes noted under 17 and 18 of this |
| | If so, give the location, the length and the clevation relative to the spillway crest and the |
| | ter and slopes of the ground of such possible wastes |
| failure which structu width of the cha | State if any damage to life or to any buildings, reads or other property could be caused by any possible of the above structure. Describe the location, the character and the use of buildings below the structure might be damaged by any failure of the structure; of roads adjacent to or crossing the stream below the re, giving the lowest elevation of the roadway above the stream bed and giving the shape, the height and the of stream openings; and of any embankments or steep slopes that any flood could pass over. Also indicate racter and use made of the ground below the structure. The dam should fail considerable damage would be done to the lower parts okville Center. |
| 17. | Wastes. The spillway of the above structure isfeet long in the clear; the waters are the right end by a the top of which isfeet above the spillway |
| | nd has a top width of |
| 18. | There is also for flood discharge a pipeinches inside diameter and the battom is |
| | ow the spillway crest; and a (sluice, gate outlet) |

The second secon

19. Apron. Below the spillway there is xxx apron built of...... feet wide and ______feet thick. The downstream side of the apron has a thickness of ______feet for a width offcet. 20. Has the structure any weaknesses which are liable to cause its failure in high flows? 21. Sketches. On the back of this report make a sketch to scale for each different cross-section of the above structure at the greatest depth; giving the height and the depth from the surface of the foundation, the bottom width, the top width (for a concrete or majorny spillway at two feet below the crest), the elevation of the top in reference to the spillway crest, the length of the section, and the material of which the section is constructed; on the spillway section show a cross section of the apron, giving its width, thickness and material, and show the abutment or wash wall at the end of the spillway, giving its heights and thickness. Mark each section with a capital letter. Also sketch a plan; show the above sections by their top lines, giving the mark and the length of each; the openings by their horizontal dimensions; the abutments by their top width and top lengths from the upstream face of the spillway section; and outline the apron. Also sketch an elevation of each end of the structure with a cross section of the banks, giving the depth and width excavated into the banks. 22. WATER SUPPLY. The waters impounded by the above structure have Levil been used for a public water supply since 1879 by the City of New York

mar gande

For profiles of the dams of the Hempstead Reservoir see print attached

The above information is correct to the best of my knowledge and belief.

Kunicipal Building New York

February 1925

Chief Engineer Bureau of Water Supp?

(A server server for every short mile to be title or authority)

DATE FILMED

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